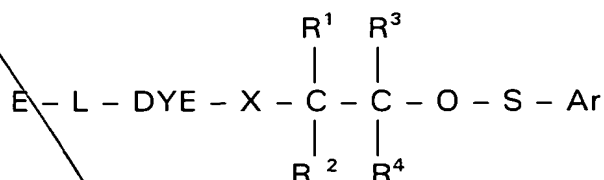


1. A compound comprising sulfenates having the formula,



wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, steroid receptor binding molecules, and carbohydrate receptor binding molecules, and dihydroxyindolecarboxylic acid; L and X are independently selected from the group consisting of $-(\text{R}^5)\text{NOC}-$, $-(\text{R}^5)\text{NOCCH}_2\text{O}-$, $-(\text{R}^5)\text{NOCCH}_2\text{CH}_2\text{O}-$, $-\text{OCN}(\text{R}^5)-$, $-\text{HNC}(=\text{S})\text{NH}-$, and $\text{HNC}(=\text{O})\text{NH}-$; DYE is an aromatic or a heteroaromatic radical derived from the group consisting of cyanines, indocyanines, phthalocyanines, rhodamines, phenoxazines, phenothiazines, phenoselenazines, fluoresceins, porphyrins, benzoporphyrins, squaraines, corrins, croconiums, azo dyes, methine dyes, indolenium dyes, crellins, and hypocrellins; R^1 to R^5 are independently selected from the group comprising hydrogen, C1-C10 alkyl, C5-C10 aryl, C1-C10 polyhydroxyalkyl, and C1-C10 polyalkoxyalkyl; and Ar is an aromatic or heteroaromatic radical derived from the group consisting of benzenes, naphthalenes, naphthoquinones, diphenylmethanes, fluorenes, anthracenes, anthraquinones, phenanthrenes, tetracenes, naphthacenediones, pyridines, quinolines, isoquinolines, indoles, isoindoles, pyrroles, imidazoles, oxazoles, thiazoles, pyrazoles, pyrazines, purines, benzimidazoles, furans, benzofurans,

Sub
AS

FILED 2010-06-06

THE UNIVERSITY OF CHICAGO

2. The compound of claim 1 wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and steroid receptor binding molecules; L and X are independently selected from the group consisting of $-(R^5)NOC-$, and $-(R^5)NOCCH_2O-$; DYE is derived from cyanines; R^1 to R^5 are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.

3. The compound of claim 1 wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and steroid receptor binding molecules; X is selected from the group consisting of $-(R^5)NOC-$, and $-(R^5)NOCCH_2O-$; DYE is derived from phthalocyanines; R^1 to R^5 are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.

b2
cont

0000000000000000000000000000000000

4. The compound of claim 1 wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and steroid receptor binding molecules; L and X are independently selected from the group consisting of $-(R^5)NOC-$, and $-(R^5)NOCCH_2O-$; DYE is derived from rhodamines; R^1 to R^5 are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.
5. The compound of claim 1 wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and steroid receptor binding molecules; L and X are independently selected from the group consisting of $-(R^5)NOC-$, and $-(R^5)NOCCH_2O-$; DYE is derived from porphyrins; R^1 to R^5 are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.
6. The compound of claim 1 wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin

B2
cont

receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and steroid receptor binding molecules; L and X are independently selected from the group consisting of $-(R^5)NOC-$, and $-(R^5)NOCCH_2O-$; DYE is derived from benzoporphyrins; R¹ to R⁵ are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.

7. The compound of claim 1 wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and steroid receptor binding molecules; L and X are independently selected from the group consisting of $-(R^5)NOC-$, and $-(R^5)NOCCH_2O-$; DYE is derived from corrins; R¹ to R⁵ are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.

8. The compound of claim 1 wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and steroid receptor binding molecules; L and X are independently selected from the

B²
cont

group consisting of $-(R^5)NOC-$, and $-(R^5)NOCCH_2O-$; DYE is derived from phenothiazines; R^1 to R^5 are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.

9. The compound of claim 1 wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and
5 steroid receptor binding molecules; L and X are independently selected from the group consisting of $-(R^5)NOC-$, and $-(R^5)NOCCH_2O-$; DYE is derived from hypocrellins; R^1 to R^5 are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.

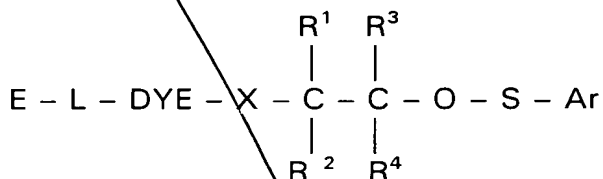
10. The compound of claim 1 wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and
5 steroid receptor binding molecules; L and X are independently selected from the group consisting of $-(R^5)NOC-$, and $-(R^5)NOCCH_2O-$; DYE is derived from fluoresceins; R^1 to R^5 are independently selected from the group consisting of

B2
cont

11. The compound of claim 1 wherein E is associated with a biomolecule selected from the group consisting of hormones, amino acids, peptides, peptidomimetics, proteins, nucleosides, nucleotides, nucleic acids, enzymes, carbohydrates, glycomimetics, lipids, albumins, monoclonal antibodies, polyclonal antibodies, receptors, inclusion compounds, receptor binding molecules, polyaminoacids, polyols, polyamines, polyacids, oligonucleotides, aborols, dendrimers, and aptamers.

12. A method of performing a phototherapeutic procedure which comprises the steps of:

(a) administering to a target tissue in an animal in an effective amount of sulfenate photosensitizers having the formula



- 5
- 10 wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, steroid receptor binding molecules, and carbohydrate receptor binding molecules, and dihydroxyindolecarboxylic
- 15 acid; L and X are independently selected from the group consisting of $-(\text{R}^5)\text{NOC}-$, $-(\text{R}^5)\text{NOCCH}_2\text{O}-$, $-(\text{R}^5)\text{NOCCH}_2\text{CH}_2\text{O}-$, $-\text{OCN}(\text{R}^5)-$, $-\text{HNC}(=\text{S})\text{NH}-$, and $\text{HNC}(=\text{O})\text{NH}-$; DYE is an aromatic or a heteroaromatic radical derived from the group consisting of cyanines, indocyanines, phthalocyanines, rhodamines, phenoxazines, phenothiazines, phenoselenazines, fluoresceins, porphyrins,
- 20 benzoporphyrins, squaraines, corrins, croconiums, azo dyes, methine dyes, indolenium dyes, crellins, and hypocrellins; R^1 to R^5 are independently selected from the group comprising hydrogen, C1-C10 alkyl, C5-C10 aryl, C1-C10 polyhydroxyalkyl, and C1-C10 polyalkoxyalkyl; and Ar is an aromatic or
- 25 naphthalenes, naphthoquinones, diphenylmethanes, fluorenes, anthracenes,

Sub
A4

TEDECO-07950

anthraquinones, phenanthrenes, tetracenes, naphthacenediones, pyridines, quinolines, isoquinolines, indoles, isoindoles, pyrroles, imidazoles, oxazoles, thiazoles, pyrazoles, pyrazines, purines, benzimidazoles, furans, benzofurans, dibenzofurans, carbazoles, acridines, acridones, phenanthridines, thiophenes,

30 benzothiophenes, dibenzothiophenes, xanthenes, xanthonenes, flavones, coumarins, and anthacyclines; and

(b) exposing said target tissues with the light of wavelength between 300 and 950 nm with sufficient power and fluence rate to cause necrosis or apoptosis of the said target tissue.

13. The method of claim 12 further comprising the step of allowing said photosensitizer to accumulate in said target tissue.

14. The method of claim 12, wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and steroid receptor binding molecules; L and X are independently selected from the group consisting of $-(R^5)NOC-$, and $-(R^5)NOCCH_2O-$; DYE is derived from cyanines; R^1 to R^5 are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.

132
out

15. The method of claim 12, wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and steroid receptor binding molecules; X is selected from the group consisting of $-(R^5)NOC-$, and $-(R^5)NOCCH_2O-$; DYE is derived from phthalocyanines; R^1 to R^5 are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.

16. The method of claim 12, wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and steroid receptor binding molecules; L and X are independently selected from the group consisting of $-(R^5)NOC-$, and $-(R^5)NOCCH_2O-$; DYE is derived from rhodamines; R^1 to R^5 are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.

17. The method of claim 12, wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin

۲۷

19. The method of claim 12, wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and steroid receptor binding molecules; L and X are independently selected from the group consisting of $-(R^5)NOC-$, and $-(R^5)NOCCH_2O-$; DYE is derived from corrins;

B2
ent

R¹ to R⁵ are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.

5
TUEDEC 6036360

20. The method of claim 12, wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and steroid receptor binding molecules; L and X are independently selected from the group consisting of -(R⁵)NOC-, and -(R⁵)NOCCH₂O-; DYE is derived from phenothiazines; R¹ to R⁵ are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.

5

21. The method of claim 12, wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and steroid receptor binding molecules; L and X are independently selected from the group consisting of -(R⁵)NOC-, and -(R⁵)NOCCH₂O-; DYE is derived from hypocrellins; R¹ to R⁵ are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.

22. The method of claim 12, wherein E is selected from the group consisting of somatostatin receptor binding molecules, heat sensitive bacterioendotoxin receptor binding molecules, neurotensin receptor binding molecules, bombesin receptor binding molecules, cholecystekinin receptor binding molecules, and steroid receptor binding molecules; L and X are independently selected from the group consisting of $-(R^5)NOC-$, and $-(R^5)NOCCH_2O-$; DYE is derived from fluoresceins; R^1 to R^5 are independently selected from the group consisting of hydrogen, C1-C10 alkyl, C5-C10 aryl, and C1-C10 polyhydroxyalkyl; and Ar is an aromatic radical derived from benzene.

23. The method of claim 12 wherein E is associated with a biomolecule selected from the group consisting of hormones, amino acids, peptides, peptidomimetics, proteins, nucleosides, nucleotides, nucleic acids, enzymes, carbohydrates, glycomimetics, lipids, albumins, monoclonal antibodies, polyclonal antibodies, receptors, inclusion compounds, receptor binding molecules, polyaminoacids, polyols, polyamines, polyacids, oligonucleotides, aborols, dendrimers, and aptamers.

24. The method of claim 23 wherein the effective amount of the sulfenate photosensitizer administered to the target tissue is in a range of about 0.1 mg/kg body weight to about 500 mg/kg body weight.

25. The method of claim 24 wherein the effective amount of the sulfenate photosensitizer administered to the target tissue is in a range of about 0.5 mg/kg body weight to about 2 mg/kg body weight.

26. The method of claim 12 wherein the sulfenate photosensitizer is parenterally administered to the target tissue in a formulation including the sulfenate photosensitizer and materials selected from the group consisting of pharmaceutically acceptable buffers, emulsifiers, surfactants, and electrolytes.

27. The method of claim 26 wherein the formulation is parenterally administered to the target tissue in a concentration in a range of about 1 nM to about 0.5 M.

28. The method of claim 12 wherein the sulfenate photosensitizer is enterally administered to the target tissue in a formulation including the sulfenate photosensitizer and materials selected from the group consisting of buffers, surfactants, emulsifiers, and thixotropic agents.

29. The method of claim 12 wherein the sulfenate photosensitizer is topically administered to the target tissue in a formulation including the sulfenate photosensitizer and materials selected from the group consisting of liquid excipients and semisolid excipients.

09898809-070304

B2
cont

B²_{cont}

of claim 12 wherein
selected from the group
olution.